

“The significant problems we face cannot be solved at the same level of thinking we were at when we created them.”

Albert Einstein

Preface to Third Edition

The Process Improvement Guide (PIG) is published by the Coast Guard Quality Center and is available through the Coast Guard Institute. The PIG provides assistance to team leaders and facilitators in their management of performance improvement projects. It's not a complete reference on Quality tools or Project Management, but rather a **memory jogger** with numerous summaries and checklists. Its structure parallels the Handbooks for Team Leaders and Team Facilitators published by the Council for Continuous Improvement (CCI), a national organization to which the Coast Guard belongs.

CCI's handbooks on Team Member Roles and Continuous Improvement Tools provide valuable expansions on the material in this guide. Quality Performance Consultants (QPCs) in your region are also available to provide coaching, advice, and training on performance improvement methods.

The checklists and tools found in this guidebook are designed to increase a team's knowledge and skill in process improvement, problem-solving, and meeting management so they can improve their performance and increase customer satisfaction.

Each of us plays a role in helping to achieve performance improvement. Commitment is the **most** important ingredient. Once you have this commitment and willingness, the guidance in this booklet will aid you immensely on the journey towards improving performance.

The Quality Center appreciates the many improvement suggestions received from users of previous editions.

the **Quality Center Staff**

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Team Leader & Facilitator Responsibilities

Team leaders and facilitators play key roles in the management and completion of improvement projects. These roles include

- selecting the appropriate process improvement or problem-solving model;
- managing meetings;
- interfacing with the team's sponsor;
- cultivating teamwork;
- training team members on applicable process improvement models and tools; and
- planning work.

Team activities work best when each member of the team understands both the performance improvement process and the crucial, interdependent roles each team member performs.

The information contained in these brief descriptions of team leader and facilitator roles and checklists is not intended to be all-inclusive. As a member of any team, you may have slightly different duties assigned based upon your unit's specific approach or needs in the pursuit of performance improvement.

Team Leader Overview

Team leader is a broad term applying to leaders of smaller groups (e.g., natural work groups, problem-solving teams, focus groups, etc.). They often wear multiple team hats, acting as leaders and as team members. The team leader of a Quality Action Team (QAT) is normally designated in the QAT's Charter. Team leaders for natural work groups (NWGs) are normally established by billet or position. However, any member of an NWG may be designated as team leader for a particular NWG meeting or improvement project. The section titled "Types of Performance Improvement Teams" summarizes the attributes of QATs and NWGs.

The team leader responsibilities contained in this section apply to leaders of any group whether or not associated with an improvement project. The table on the next page lists the major roles and tasks of team leaders. The emphasis given to each responsibility varies from one team to the next.

Major Roles of Team Leader	Tasks
Project Management <i>directing the team's attention to the necessary work</i>	<ul style="list-style-type: none"> • Select appropriate model (Process Improvement or Problem-Solving) • Follow model sequence • Apply appropriate team tools • Create and update workplans • Monitor progress • Lead team meetings • Ensure record keeping • Maintain focus
Team Building <i>using methods and creating an environment so each member participates in generating ideas, interpreting findings, and making decisions</i>	<ul style="list-style-type: none"> • Use team building methods. For example: <ul style="list-style-type: none"> • Develop ground rules • Use group idea generation tools • Use consensus for making decisions • Help group through the stages of group development • Use the Seven-step Coaching Cycle (see “Coaching Style of Leadership” next page) • Cultivate full participation. For example: <ul style="list-style-type: none"> • Enforce guidelines • Negotiate and mediate • Counsel individuals • Adjust membership • Provide training in Models and Tools
Organizational Interface <i>representing the project to others</i>	<ul style="list-style-type: none"> • Gain and maintain alignment with chartering body/senior managers • Make presentations • Maintain written communications • Initiate personal contact and request feedback • Champion performance improvement initiatives

A Coaching Style of Leadership is the most effective for team building. It is one aspect of the Situational Leadership (SITLEAD) model developed by Ken Blanchard and Paul Hersey, and taught by the Coast Guard's Leadership and Management School.

The CCI Team Leader Handbook elaborates on the Seven-Step Coaching Cycle. It can be used throughout the project. In fact, it is valuable in all supervisory situations.

Seven-Step Coaching Cycle	
1. Clarify Expectations	Coaching is purposeful and directed toward specific performance expectations, not based on personal reactions. Openly communicate goals and encourage mutual respect, meeting commitments, and participation in team activities.
2. Define Supporting Behaviors	Under your guidance, the team identifies positive behaviors that will help meet expectations. See the discussion concerning "ground rules."
3. Assess Behaviors	Assess team behaviors relative to agreed-upon supporting behaviors.
4. Give Feedback	Phrased in terms of observable, objective behavior. Don't address motivation or intention or personal qualities. This refers to both individual and team behaviors.
5. Determine Options	Suggest alternatives. Consider involving the team when suggesting options for complex matters. If an individual is behaving inappropriately, you may want to speak with him/her privately to develop options. See "Managing Individuals."
6. Make Corrections	Facilitate team agreement on which option to choose. Consensus negotiation may be needed for important matters. See "Managing Individuals."
7. Reinforce or Repeat	Reinforce the new behavior if it improved. Repeat the cycle if it didn't.

Organizational Interface. If a team is chartered, the sponsor is the person who signed the charter. A secondary sponsor for a chartered team can be designated in the charter or is a Guidance Team leader. The sponsor for a NWG operating without a charter is the supervisor of the NWG's positional leader. Alignment between the chartering body and the team leader is imperative to ensure a common understanding of the team's purpose and operating parameters. The following are some issues which should be discussed between the chartering body and the team leader prior to commencing the team's activities.

- role(s) of the team leader and chartering body
- purpose and intent of the charter
- parameters the team has to work within (e.g., time, funds, equipment, people, policy)
- who has decision-making authority
- concerns regarding accomplishing the charter objectives
- strategies to accomplish the desired objectives

It's important to keep the sponsor aware of progress and committed to team success. They don't want surprises. If you have concerns about something, make sure the sponsor knows of them. Encourage them to attend some of the meetings as he/she can. They can approve or support changes to the charter, including changes to membership, time lines, and project scope. Good alignment is often the difference between the success and failure of a team. Let sponsors know about:

- team goals and project plans
- progress according to plans
- milestones reached
- interim findings and recommendations
- roadblocks encountered
- resources needed

Team leaders need to ensure interests of people not on the team are adequately represented. Get the commitment of people and groups who will be affected by the team's actions before decisions are made. And don't be afraid to adjust membership if it is suggested by the team's direction.

Secondary Facilitation. In addition to managing what is being discussed, the team leader is also responsible for supporting the process on how the content is being discussed. As a team leader and group member supporting the process, you are a "secondary facilitator." Secondary facilitation behaviors include:

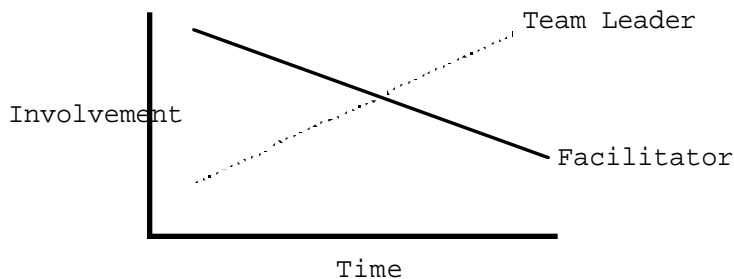
- **Gate Opening:** Providing quiet individuals the opportunity to participate. Some people will not cut another person off and will wait for a quiet moment before speaking. In some meetings there are no, or very few, quiet moments. Create an opportunity like, "Petty Officer Gonzales, what do you think about this?"
- **Safe-guarding:** Ensuring individuals have a chance to finish their thoughts. When ideas begin to flow quickly, members begin before others have finished. Not everyone has the ability to present a complete and polished thought off the top of their head. Safe-guard this as: "Let's go back to Fireman Smith, please share the rest of your thought." or "Before we move ahead, let's give Fireman Smith a chance to finish his thought."
- **Listen First:** Although leaders often ask for other thoughts, subordinates or team members still may simply nod in agreement. To overcome this, listen first. Find out what your co-workers think before sharing your own opinion. Set the tone by simply saying, "I'd like to first hear what each of you thinks about this."

- **Acknowledge emotion:** Confront it when it arises and get to the facts behind it. Pretending someone isn't upset will close group communication (see the Seven Step Coaching Cycle).

Developing and using facilitation skills will help create an open work environment and encourage participation by everyone.

Relationship with facilitator: The team leader works with the facilitator to help the group achieve its objectives and accomplish its goals. The relationship between the team leader and the facilitator evolves over time. As projects progress and groups mature in group dynamics and in their use of models and tools, the team leader's meeting management involvement increases. This may decrease the need for the facilitator's involvement.

Facilitator/Team Leader meeting management involvem



Team leader as facilitator: While it is ideal to have a facilitator at all of your meetings, sometimes out of necessity the team leader will take on the role of facilitator. If you find yourself in this situation, refer to the “Facilitator Overview” section of this guidebook.

Facilitator Overview

Facilitate:

- To make easy or easier.
- To lighten the work of, assist, help.
- To increase the ease of performance of any action.

Webster's New World Dictionary

As a facilitator, your job is to help teams complete their assigned tasks. This is accomplished through the use of team tools, disciplined problem-solving methods, and continuous improvement techniques.

You will become a skillful observer of the meeting process and learn to make needed adjustments, give and receive feedback, and act as a coach. By managing group dynamics and facilitating effective meetings, you will assist teams in improving their processes.

Your focus is on the “care and feeding” of the team. You are responsible for helping the team be as productive as possible. You're to guide them, teach them, and encourage their growth and development as a team. Ultimately, you want to work yourself out of a job, to the point where the group knows where to go and how to get there without your assistance. You are not to contribute to the content of the session.

The table on the following page lists the major roles and tasks of facilitators.

Major Roles of Facilitator	Tasks
Coach the Team Leader <i>coaching the team leader in the process of accomplishing the meeting objectives</i>	<ul style="list-style-type: none"> • Conduct one-on-one planning with team leader • Provide agenda guidance • Provide feedback to the team leader (refer to “Seven-step Coaching Cycle” on page 8)
Facilitator <i>using methods to solicit ideas so each member participates in generating ideas, interpreting findings, developing solutions, and making decisions</i>	<ul style="list-style-type: none"> • Clarify team members’ roles • Facilitate agenda. For example: <ul style="list-style-type: none"> ♦ warm-ups ♦ ground rules ♦ idea generation ♦ decision-making ♦ data collection methods ♦ data analysis • Monitor sequence of model • Focus team on task at hand • Monitor stages of group development • Manage group dynamics and individuals • Cultivate cooperation. For example: <ul style="list-style-type: none"> ♦ mediate ♦ encourage ♦ enforce ground rules ♦ coach
Trainer <i>training team members</i>	<ul style="list-style-type: none"> • Provide Just in-time (JIT) training on: <ul style="list-style-type: none"> ♦ Models and Tools, ♦ Team Roles and Responsibilities ♦ Continuous Improvement Concepts

Facilitator Behaviors. In *How To Make Meetings Work*, Michael Doyle and David Straus indicate there are several basic facilitator behaviors you need to learn and practice to become proficient in all three of your roles. With practice, the execution of these skills become second nature. They are:

- Remain a neutral servant of the group
- Don't evaluate or contribute ideas regarding content
- Suggest alternative methods and procedures
- Encourage participation
- Protect people and their ideas
- Focus group on task
- Help group find Win/Win solutions

The checklist on the next page will help you prepare for your facilitative efforts.

Facilitator Checklist

Preparing for the Meeting

- ☐ Gain alignment with team leader.
 - Team leader understands your role
 - Team leader understands your expectations of him/her as team leader
 - Identified concerns team leader has about accomplishing the desired outcomes
 - Create a strategy, in partnership with team leader, to accomplish the desired meeting objectives
- ☐ Review Agenda (provide recommendations)
- ☐ Ensure proper room setup (e.g., tables & chairs arranged properly, easel(s), flipchart paper, color markers, Post-its)
- ☐ Develop warm-up exercise
- ☐ Review facilitative tools for possible use

Beginning of the Meeting

- ☐ Introduce self & explain your role
- ☐ Review agenda
- ☐ Conduct warm-up exercise
- ☐ Establish Ground Rules
- ☐ Establish Parking Lot
- ☐ Review group roles & secondary facilitating
- ☐ Identify group's expectations

During the Meeting

- ☐ Use tool(s) appropriately
- ☐ Record group memory
- ☐ Adhere to "Facilitative Behaviors"
- ☐ Monitor/manage group dynamics/behaviors
- ☐ Cover agenda items

Conclusion of the Meeting

- ☐ Review agenda/objectives
- ☐ Review accomplishments
- ☐ Address parking lot issues
- ☐ Summarize key points
- ☐ Identify appropriate follow-up
- ☐ Evaluate meeting

Meeting Management

Good meetings are an absolute necessity to good management. Meetings are an effective way for groups to process and share information. Meetings are a process; they can be broken down into individual steps which we can continuously improve. However, some meetings are ineffective and inefficient -- wasting valuable time and resources and causing frustration, low morale, and possibly poor performance.

Helping the team leader construct good meeting agendas is one of the facilitator's most important responsibilities -- especially with novice team leaders. Meetings should not be used for work that does not require the entire team. Rather, meetings are for status reviews, idea generation, decision making, and training.

Ingredients of Effective Meetings: In *How To Make Meetings Work*, Michael Doyle and David Straus identified the following five basic criteria for a good meeting:

- Everyone's role and responsibilities during the meeting are clearly defined and agreed upon.
- Common focus on CONTENT (what is being discussed)
- Common focus on PROCESS (how it's being discussed)
- Open and balanced communication flow
- Members and their ideas are valued

Planning a Meeting. Proper planning for a meeting is the critical element to its success. To effectively use participants' time, more time may be spent planning a meeting than actually conducting it. In *Mining Group Gold*, Thomas Kayser points out "...taking the time to plan the structure of a group session is not a discretionary activity for the meeting caller, it is a non-negotiable obligation." Kayser further states, "... group sessions with a clear-cut agenda tend to be better focused, significantly more effective, and achieve more specific results than meetings without an agenda."

There is no specific format for an agenda; there are however some fundamental items which should be included in an agenda which will help facilitate effective and efficient meetings. The agenda should include a combination of team-building and task-oriented items because the meeting outcomes define and direct the work of the team.

The following agenda checklist is provided to help you prepare an agenda.

Agenda Checklist

Answer these questions before developing the agenda:

- What's the purpose and all desired outcomes?
- Is a meeting necessary to achieve the desired objectives?
- Who should attend? (Invite the minimum number of people required to achieve the desired outcome.)

Develop agenda. Agendas should include the following items:

- ☐ Date, starting *and* ending times
- ☐ Location
- ☐ Purpose of the meeting
- ☐ All known desired outcomes
- ☐ Develop or review ground rules
- ☐ Agenda items. The following are possible items the meeting leader may consider:

- | | |
|----------------------------|------------------------------------|
| • warm-ups | • review of last meeting's minutes |
| • mission review | • model and/or tool selection |
| • assignments & scheduling | • progress report/status |
| • report of findings | • interpretation of findings |
| • next steps | • organizational communications |
| • presentations | • Just-In-Time training |

- ☐ Person responsible for each item
- ☐ Time allotted for each item
- ☐ Assigned roles (facilitator, recorder, timekeeper)
- ☐ Time allotted for meeting evaluation

Ground Rules

Ground rules reflect team values and create an environment for achieving common goals. They are the basis for judging team cooperation and behaviors, and provide a team with the necessary framework within which they can operate efficiently and effectively. They....

- clarify responsibilities,
- describe how meetings will be run, and
- how decisions will be made.

Ground rules are living documents that may be changed or added to as groups mature; they should initially be developed at the first meeting. The following list of typical ground rules is not all-inclusive. The ground rules your group develops may include some or all of those listed.

Typical Ground Rules

- Treat each other with respect
- Participate actively and willingly
- Solicit others' ideas
- Share responsibility
- Team-made decisions will be used
- Meetings will begin and end on time
- Homework will be completed on time
- Decisions are based on data wherever possible
- Right decisions are superior to quick decisions
- Share all relevant information

Parking Lot

Helping groups stay on track is important for team leaders and facilitators. If a team member starts to head off on a tangent and the team leader or facilitator wants to bring them back, the Parking Lot is a good way to do so. The Parking Lot is a designated place, such as a piece of flipchart paper taped to the wall, where team members may record ideas for later consideration. The Parking Lot permits sticking to the agenda while not losing important thoughts not crucial at the time. However, don't forget to attend to the items placed in the Parking Lot at some point toward the end of the meeting.

Group Development

Anytime you put a group of people together they will go through the stages of group development before evolving into a self-sufficient high-performing team. Understanding the stages of group development is important for team leaders and facilitators. These stages occur in all teams, not just quality, special, or project teams. The transition from one stage to the next is not crystal clear.

Groups take on certain characteristics, fulfill specific roles, and follow a systematic development process. Many groups have assigned roles: team leader, timekeeper, recorder, and facilitator. As a group begins to determine how they will do business, several other informal undocumented roles may arise. An informal leader may emerge; this individual is not necessarily the senior-most member of the group but the member possessing the personal power that makes others want to follow. A comic may surface; this individual is always trying to lighten things up. A devil's advocate may become apparent; this person presents the opposite point of view to ensure the group looks at the issue from every direction.

These are a few of the roles that may emerge. The important thing to understand is these roles are a natural part of human diversity and group dynamics. You are neither expected to encourage these behaviors nor prevent them from happening.

Different groups mature at different paces, and changes of personnel or work conditions can set the group back to an earlier phase. The following stages are common to all work groups.

Stages of Group Development				
	Form	Storm	Norm	Perform
Characteristic s of the Group	<ul style="list-style-type: none"> • Uncertain • Tentative • Serious • Unclear of Goals 	<ul style="list-style-type: none"> • Conflict • Team organizing • Goals still unclear • Hostility • Defensive 	<ul style="list-style-type: none"> • Committed to task • Conflicts resolved • Harmony • Sense of team pride 	<ul style="list-style-type: none"> • Fully functional • Self-organizing • Flexible • Innovative
Team Member Behaviors	<ul style="list-style-type: none"> • Talkative • Polite • Fearful • Anxious • Optimistic • Seeking belonging 	<ul style="list-style-type: none"> • Disagree • May resist demands of teamwork & homework 	<ul style="list-style-type: none"> • Comfortable • Sense of belonging • Share willingly • Enjoy work • Work earnestly 	<ul style="list-style-type: none"> • Function well together • Understand others' views • Experience personal growth
Leader's Tasks	<ul style="list-style-type: none"> • Give clear direction • Get members acquainted • Create positive atmosphere • Assign straight-forward, simple tasks • Sensitive to members' need for direction 	<ul style="list-style-type: none"> • Open up conflict • Move toward negotiation & consensus • Get members to assume more tasks responsibly 	<ul style="list-style-type: none"> • Let team assign own tasks • Provide direction • Hold celebration • Encourage team to review own goals and progress • Listener & facilitator 	<ul style="list-style-type: none"> • Participate • Consult • Inspire • Be involved in tasks as needed • Keep comms & information flowing • Reinforce & celebrate achievement • Provide new vision
Output	<ul style="list-style-type: none"> • Little gets done 	<ul style="list-style-type: none"> • Low 	<ul style="list-style-type: none"> • Moderate to high 	<ul style="list-style-type: none"> • Very high
Facilitation Tasks	<ul style="list-style-type: none"> • Organize • Teach • Ground rules • Set standards • Goal setting • Manage expectations 	<ul style="list-style-type: none"> • Listen & observe • Enforce ground rules • Conflict management • Patient • Counsel • Advise • Intervention 	<ul style="list-style-type: none"> • Feedback • Affirm • Coach • Encourage 	<ul style="list-style-type: none"> • Foster consensus • Coach • Cheerlead • Withdraw

Managing Individuals

Groups take on personalities based on their established norms -- values and behaviors accepted and held in high regard by the group.

Individuals who deviate from the group's norms set themselves apart. This can be done through subtle behaviors (not listening to others, starting discussions off the topic) or through significant behavioral differences (getting angry, becoming hostile, verbally abusing other members). Regardless of the degree of the deviation, these individuals are signaling some unmet need that must be brought out.

Negotiating is an effective means of resolving conflict and achieving agreement between two or more team members. It involves getting people to reach agreement based upon their satisfying a mutually held goal. Negotiators represent their own interests. Mediators help others negotiate successfully. For critical issues, consensus is important. The process continues until a position is found that all negotiators can "support." Then they commit to the mutual decision. *Getting to Yes: Negotiating Agreement Without Giving In* by Roger Fisher and William Ury is an excellent book on the subject of negotiating.

Keys to Successful Negotiation

- Determine a clear goal to which all parties agree.
- Ensure each party's individual concerns are clear.

Then

- Identify alternatives.
- Select alternatives that achieve goals.
- Adjust alternatives to meet highest priorities and most important concerns.

Dealing with Emotion. Although many things can cause disruptive behavior, your task as facilitator/team leader is to mitigate the disruptive behavior. In *Mining Group Gold*, Thomas Kayser indicates “Few things in a facilitator’s tool kit are more important than an understanding of this simple sequence of group behavior:
FEELINGS → FACTS → SOLUTIONS.”

When an individual disrupts group harmony, the facilitator and the team leader need to work together to uncover the heart of the problem. It is pointless to ignore the feeling because the individual (or group) is expressing something to indicate he or she is not ready to move on. To handle this properly, the feeling must be accepted, acknowledged, and processed in an organized manner. As Kayser points out, “Having a chance to ventilate feelings in a structured way, the group is now ready to develop and analyze the facts [behind them] in a less emotional, more objective manner... In any situation, be it discussion, problem-solving, or decision making, facts can be handled more smoothly and effectively once feelings have been addressed.”

To address frustrated feelings expressed by an individual, they need to be given the opportunity to share the thoughts consuming them and their behavior. As a team leader and facilitator, your job is to create the opportunity.

- Identify the behavior and the feeling being demonstrated, be specific and non-confrontational.
- Ask if your assessment is accurate.
- Allow the individual an opportunity to share their feelings.
- Guide the individual to the facts in their possession that is making them feel this way.

Work with the team to generate a win/win solution to the situation.

Overview of Performance Improvement

Adopting the philosophy of Total Quality Management (TQM) requires each of us to make a shift in how we look at the work we do. Too often, we focus only on those things we are directly involved in and never stop to ask ourselves, “Is this the right thing to do or the right way to do it?”

TQM asks us to do that - every day. It asks us to challenge our basic assumptions about how we do our jobs. We must look at ways we can continually improve our individual efforts to add value to outputs and mission performance and satisfy our customers. Outputs and mission performance result from daily work processes.

To improve any work process we should:

- Understand the business (mission) of the unit.
- Know who are the end-users (customers) and their requirements.
- Clearly define the current work process.
- Identify the output(s) of the process.
- Measure the effectiveness and efficiency of the process.
- Continually look for improvement opportunities.

The rest of the Process Improvement Guide will present information, techniques and tools for a systematic approach to improve performance. It will help you discover both what is the right thing to do and the right way to do it through analysis, teamwork, and customer feedback.

What to Work On

Deciding what to work on can be a difficult task. Whether it is a team seeking to improve its own processes or Management faced with multiple improvement opportunities, the question, “where do we start?” must be answered. Whatever the choice, the project must be a worthwhile endeavor. In other words:

- **It’s achievable.** It’s not too expensive, too complicated, or owned by someone else.
- **It’s important.** There’s no point in working on a problem that nobody cares about.

The project doesn’t have to be huge to be important. Many seemingly minor problems or performance gaps are worth solving. Additionally, you’ll find that solving a small, but important problem is an excellent way for managers to demonstrate their commitment to excellence; it also shows employees their capability to make a change. Finally, fixing an easy one will be good practice for working on a tougher one next time around.

Several factors should be considered when deciding what to do:

- **Customers.** Satisfaction, complaints, trends in behavior, etc.
- **Organizational Goals.** What’s important to management?
- **Other Stakeholder Expectations.** Employees, community, neighbors, suppliers, etc.
- **Productivity.** Costs in money, labor, material, and equipment, etc.
- **Mission Performance.** Other than customer expectations or productivity.
- **Organizational Assessment.** e.g., Commandant’s Quality Award.

Once a project is chosen, the performance improvement team must choose the appropriate model to use. This section describes models which can be used in process improvement and problem-solving.

Types of Performance Improvement Teams

We have two, types of performance improvement teams in the Coast Guard: Quality Action Teams (QATs) and Natural Work Groups (NWGs). The table summarizes the differences.

Attribute	QAT	NWG
Membership	Cross-functional, i.e., members from more than one NWG; maybe even from more than one command.	Co-workers from one work center (e.g., a small unit, a section, a branch, etc.) who work together daily and own one or more work processes.
Basis	A Charter issued by a sponsor or management team (e.g., QMB). When the project ends, the QAT is finished.	The personnel allowance list (PAL). The NWG exists until its billets and/or positions are deleted or reorganized. Members, customers and priorities constantly change.
Who decides what they work on?	The Charter tells them, at least in general.	Can choose themselves, but may be asked (or Chartered) by upper management to tackle a particular matter.
Kinds of improvement projects they work on.	Process improvement and problem-solving.	Process improvement and problem-solving.

Process Improvement and Problem-Solving

Performance improvement projects worked by teams are of two types:

- Process Improvement projects
- Problem-Solving projects

For each type of project, this booklet outlines a model for the team to follow. Facilitators can provide guidance and training on the models and the tools used within them. They can also advise team leaders and sponsors on which model to use: The Process Improvement Roadmap (PIR) or the Problem-Solving Roadmap (PSR).

Both models are applications of the FADE process shown here.

FADE Phase	Major PIR Steps	Major PSR Steps
Focus	<ul style="list-style-type: none">• Describe performance improvement objective	<ul style="list-style-type: none">• Define problem
Analyze	<ul style="list-style-type: none">• Describe process• List gaps	<ul style="list-style-type: none">• Gather data• Determine root causes
Develop	<ul style="list-style-type: none">• Develop changes	<ul style="list-style-type: none">• Develop solutions
Execute	<ul style="list-style-type: none">• Implement change• Monitor impact	<ul style="list-style-type: none">• Implement solutions• Monitor impact

As you can see, the FADE process works similarly in both types of projects. The FADE process is an application of the Shewhart Cycle (Plan-Do-Study (Check)-Act).

The team leader should maintain an open line of communication with the team's sponsor and/or other stakeholders throughout the process. It's also the team leader's job to ensure the appropriate model is used.

Selecting the correct model.

The differences between process improvement and problem-solving are not always crystal clear. This is because:

- problems affect one or more processes, and
- most process improvement projects identify gaps which are sometimes thought of as problems.

Problems are “painful” in that they precipitate some reaction that demands immediate resolution. Some of the forms in which this pain can come include failure to deliver an output, an unsafe work environment, mismanagement of funds, and loss of property.

Process gaps are not as painful. Yet, they are costly in that they cause a process to operate at less than optimal levels. For example, constant rework to correct an error produced by a step within the process, an output with which the customer is consistently less than satisfied, or a step which is always needed to correct an input to the process.

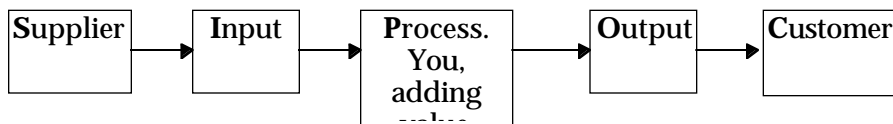
A problem-solving team knows when it succeeded because the problem is gone. Process improvement, on the other hand, is more of a relative matter since improvement is a matter of degree and not an absolute.

Whether solving a problem or improving a process, it's important to identify issues which may be “systemic.” That is when the problem or gap you are experiencing is occurring organization-wide. If a team identifies a problem or gap which could be occurring across the Coast Guard, it should report the possibility to Management. Steps can then be taken so that each affected unit doesn't “reinvent the wheel.”

When using any model, you should follow all of the steps of the model to ensure you are successful. If your team decides to change models in the middle of a project because the model you are using is not adequate, start using your new model from its beginning.

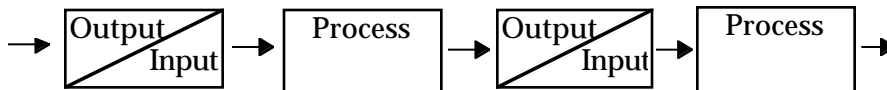
Your work efforts are part of a process, not an isolated event. All performance gaps, or problems, are related somehow to a work process. A process is a series of work steps that change inputs into outputs. An effective process adds value for the customer.

The following “SIPOC” diagram illustrates the concept of work as a process:



Customers are the end-users of the process. They are the ones who can tell you if your process is effective.

The supplier and the customer can be from within your own unit or work group or from outside the Coast Guard, depending on the process at which you're looking. Just as a supplier's output becomes your input, so too does your output become your customer's input. However, your customer may have a customer too. So, another way to look at processes is:



A string of processes is a system. When assessing your process, it's important to know what is happening downstream as well as upstream.

Performance Elements

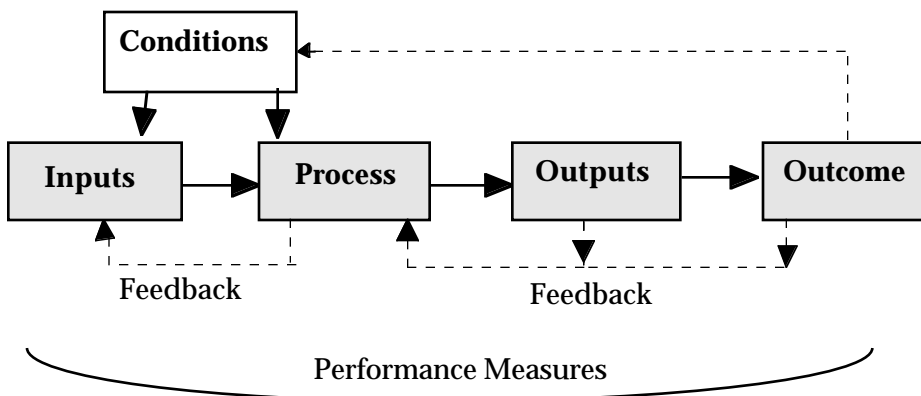
The effectiveness and efficiency of processes depends on more than the procedural steps within the process itself. To properly examine a process, a team should consider all of the performance elements. These other important factors of performance are:

Outcomes	The impact of the process and outputs on: <ul style="list-style-type: none">• Mission and goal accomplishment• Organizations• People• The natural environment
Outputs produced.	The products, services, or information
Inputs	The resources needed for the process to operate.
Conditions inputs	Factors which influence the availability of and the operation of the process.
Feedback	Solicited or unsolicited comments from others regarding the process, outputs, and outcomes.
Performance Measures efficiency	Systematically collected quantitative and qualitative data on the effectiveness and of the process.

The table on the next page shows examples of the elements which may factor into the performance of a process.

Element	Examples
Outcomes	Impact on unit missions, business and program goals, local community, air, land, sea, employee and customer satisfaction, community reaction, union concerns, management satisfaction, congressional reaction, partner response; customer use of the output
Outputs	Boardings, inspections, identification cards, seaman's documents, skilled trainees, directives, policies
Inputs	Equipment, funding, materials, information, skilled labor, requests for service
Conditions	Management priority, organization values, employee practices, work environment, policies, support systems, weather, employee attitudes
Feedback	Customer, partner, and management comments, news reports, independent studies, comments to suppliers
Performance Measures	Customer satisfaction, on-time-delivery, cycle time, and waste. See the next page for more information.

The following Work Context diagram which builds on the "SIPOC" diagram shows how the elements work together.



Customer and mission requirements are needs or expectations that your service, product, or information must meet if you are to satisfy your customers. Your goal is to constantly improve the effectiveness and efficiency of your work to meet the ever-changing needs of the customers. You need meaningful information about your process to assess and improve your work activities based on customer and mission requirements and organizational goals.

Effectiveness measures tell us how well our process outputs meet our customer requirements. The two primary Coast Guard effectiveness measures are Customer Satisfaction and On-Time-Delivery.

- **Customer Satisfaction** is a measure of how well your process output meets important requirements, e.g. reliability, features, etc.
- **On-Time-Delivery** is a measure of how often the desired process output is delivered when the customer wants it.

Efficiency measures are used to determine how well you are meeting your customer/mission requirements with minimum use of resources. The two primary measures of efficiency are Cycle Time and Waste.

- **Cycle Time** is a measure of the time a service/product takes to move from start to the end point of a process.
- **Waste** is a measure of the non-value added activities and resources used to meet customer/mission needs. There are seven types of waste.
 - ◆ Over Production
 - ◆ Transportation & conveyance
 - ◆ Excessive inventory
 - ◆ Rework
 - ◆ Queue/wait time
 - ◆ Redundant processing
 - ◆ Unnecessary motion

Tips About Process Improvement

Variation. Because of random variation in inputs, processes, and conditions; no two services or products will ever be exactly alike. This difference is known as variation. To produce quality, you must be able to produce outputs that are predictably and sufficiently uniform while at the same time satisfying customer needs. Reducing or controlling the amount of variation is crucial to improving your process.

85/15 Rule. The 85/15 Rule states 85% of all problems with a process exist due to the “system” and lie within the control of management, not the individual worker. Dr. Deming, a noted Improvement pioneer, has stated he believes the ratio is even higher.

1-10-100 Rule. This rule states that the earlier in a process you correct a problem, the less it will cost you to do so. The costs associated with fixing a problem increase by a factor of at least 10 for every step further down the process it takes to catch the problem and fix it.

In the previous edition of the PIG, we called this the **Quality Blueprint (QB)**. Most of the steps from the QB, and the important features of the Process Measurement Model from the Coast Guard Process Measurement Guide (PMG) are included in this model.

The table below lists the Process Improvement Roadmap (PIR) steps and the phases of the FADE process with which they are associated.

FADE Phases	Process Improvement Roadmap Steps
Focus	1. Organize and plan the project 2. Describe the Performance Objective 3. Align with sponsor and/or stakeholders
Analyze	4. Describe the Process 5. Identify critical performance measures 6. Develop measurement plan 7. Identify key gaps and root causes 8. Update sponsor and/or stakeholders on status
Develop	9. Choose changes 10. Gain approval of changes from sponsor and/or stakeholders
Execute	11. Implement change(s) 12. Continue monitoring performance measures 13. Advise sponsor and/or stakeholders of impact of implemented changes

Process Documentation.

Process documentation is an integral part of any improvement effort. Documentation can be accomplished two ways. Either as part of a process improvement effort or as a separate project. A team can document a process without going on to improve it by completing the Focus and Analyze phases of the PIR (through step 8)

Using the PIR in this manner will enable a work group to understand and explain how a process is currently performing. It also helps a group prioritize which processes to work on because they will have data on which to base their decisions.

Documenting a process may illuminate waste and improvement opportunities. Should this occur, the team can continue with documentation and attack the improvement opportunities later or they can proceed with developing changes to be made using the PIR.

Note: The term “roadmap” is a subset of the term “model.” Models are graphics which are used to explain or clarify a theory, concept, or process. Roadmaps are used only for processes. In this guide, they are the sequence of steps which groups can use to document or improve processes and solve problems.

The checklist which follows is a guideline for the Process Improvement Roadmap. If you are not familiar with the elements of performance, read “Performance Elements” previously described in this guide before proceeding.

PROCESS IMPROVEMENT ROADMAP CHECKLIST

1. Organize and Plan the Project.

- ◇ Review, elaborate on, and/or negotiate the charter or tasking.
- ◇ Develop a Project Plan.

2. Describe the Performance Objective.

- ◇ Identify/verify the Outcomes caused by the process and outputs and the people/organizations/environment impacted.
- ◇ Identify/verify the Outputs and the key Customers of the process.
- ◇ Determine/verify Customer and mission requirements.
- ◇ Describe the performance challenge as you understand it. Think of all stakeholders including management, process workers, customers, and beneficiaries.

3. Gain alignment with sponsor and/or stakeholders on the results of performing the above steps.

4. Describe the Process.

- ◇ Chart the Process; start with a macro flowchart and then do one to a great enough level of detail to understand the performance challenge.
- ◇ Identify/verify the key Inputs and the Suppliers who provide them.
- ◇ Identify/verify the Conditions which most influence the process.

5. Identify the Critical Success Factors.

- ◇ Identify/verify the 3 to 5 most important Critical Success Factors (CSFs). CSFs are the things your process must do well to be successful. Be picky because some things are more important than others. Include the following in your analysis:

Customer Satisfaction
On-Time-Delivery
Cycle Time

Waste
Supplier Performance
Mission
Accomplishment

6. Develop a Measurement Plan.

- ◇ Develop Performance Measures to collect data which will track the 3 to 5 CSFs you have identified as most important.
- ◇ Monitor the process by displaying data collected on charts.
- ◇ Use existing measures where possible (don't measure just for the sake of measuring).

7. Identify the Key Gaps and Root Causes.

- ◇ List performance gaps or opportunities for improvement based on the measures from Step 6.
- ◇ Identify the root causes of the identified gaps and opportunities.
- ◇ Document any root causes or performance gaps which are beyond your knowledge or control.

8. Update sponsor and/or stakeholders on status of project.

- ◇ Include a report of all gaps, root causes, or symptoms you identified which are beyond your knowledge or control.
- ◇ If you have identified no significant gaps in performance on which you intend to work at this time, present your findings. Advise your audience that you are concluding your effort and skip to Step 12.

9. Choose changes.

- ◇ Select the one (or more) most promising change(s) to make based on the identified gaps and root causes.

10. Gain approval from sponsor to implement the proposed changes.

11. Implement the Changes.

- ◇ Develop an action plan to implement the approved changes.
- ◇ Implement the changes on a trial basis, if possible.
- ◇ If the impact of the change is acceptable, recommend the change be made permanent.
- ◇ If applicable, recommend to management that the changes be implemented Service-wide.
- ◇ If the impact of the change is less than acceptable, go back to the Step 4 of the of the PIR and develop a new set of recommended changes using what you learned from your trial implementation.

12. Continue Monitoring the Performance Measures.

- ◇ If your group is a NWG, monitor the Performance Measures established in Steps 5 and 6.
- ◇ If your group is a QAT, ensure that the measurement/monitoring plan designed is properly passed to responsible parties. It's likely that a member of the QAT will be one of these people.

13. Advise sponsor and/or stakeholders of impact of implemented solutions

A problem-solving model can be useful for individuals, Quality Action Teams (QAT), Natural Work Groups (NWG), or others who have been tasked with developing solutions to a problem. The table below shows the problem-solving activities associated with each phase of the problem-solving process.

FADE Phases	Problem-Solving Roadmap Steps
Focus	1. Review and organize the project 2. Describe the problem. 3. Align with sponsor and/or stakeholders
Analyze	4. Gather data about the problem 5. Determine the root causes of the problem 6. Update sponsor and/or stakeholders on status
Develop	7. Choose solutions 8. Identify documentation to justify recommended solutions. 9. Gain approval of solutions from sponsor and/or stakeholders
Execute	10. Develop an implementation action plan 11. Implement solutions 12. Advise sponsor and/or stakeholders of impact of implemented solutions.

The checklist which follows is a guideline for the Problem-Solving Roadmap. If you are not familiar with the elements of performance, read “Performance Elements” previously described in this guide before proceeding.

PROBLEM-SOLVING ROADMAP CHECKLIST

1. Review and organize project

- ◇ Review, elaborate on, and/or negotiate the problem statement or charter.

2. Describe the Problem.

- ◇ Define the current state.
 - What is happening now? What are the symptoms of the problem? What does the group know about the problem?
 - Identify negative impacts of that state. Why is change needed? What will happen if the current state continues? How serious are the symptoms?
- ◇ Define the desired state.
 - What do you want to happen?
 - Identify the impact of achieving your desired state. How would the organization benefit from the change in the short term and in the long run?

3. Gain alignment with sponsor and/or stakeholders.

- ◇ Present your written problem statement and project plan.

4. Gather data about the problem

- ◇ If a process is involved, graph the flow at the problem point.
- ◇ Identify the people, equipment, materials, information and work environment involved at the point of the problem.
- ◇ Gather any quantitative and qualitative data already collected on the problem area.
 - Chart quantitative data to make it easier to analyze.
- ◇ If needed, collect additional data on the problem.
 - If you need more data to properly analyze the problem, create a data collection plan and collect the required information.
 - DO NOT collect additional data if it is not essential to your problem-solving effort.

5. Determine the root causes of the problem

- ◇ Analyze the charts and data you have gathered.
- ◇ Use the data to identify the elements of the process which are the underlying “root” causes of the problem.
 - Resist the urge to focus only on the people.
 - Examine all elements of performance including policies, worker and management practices, systems, people, equipment, materials, information, and environment.
- ◇ Identify any root causes or symptoms which are beyond your knowledge or control including inputs and conditions from inside or outside your organization which contribute to the problem.

6. Update sponsor and/or stakeholders on the status of your project.

- ◇ Advise them of your list of “root” causes.
- ◇ Include a report of all problems, root causes, or symptoms you identified as beyond your knowledge or control.

7. Choose solutions

- ◇ Develop a list of possible solutions based on the identified root causes.
 - Do not limit yourself to the usual answers. Think “out of the box.”
- ◇ Select one or more of the possible solutions to recommend for implementation.
 - Establish criteria for making your selection(s) such as doable, biggest impact, return on investment, etc.
 - Consider known constraints such as budget, personnel, laws and regulations.
 - Don’t eliminate possible solutions because you think Management won’t “buy into it.”

8. Identify appropriate documentation to explain/justify recommendations.

- ◇ Use existing or develop new charts and posters and/or handouts which depict the systematic way you developed your recommended solutions.
 - The documentation should include:
 - ♦ The recommended solutions
 - ♦ The root causes on which the solutions are based
 - ♦ The data used to identify the root causes
 - You can use this documentation as part of your presentation to sponsor and/or stakeholders and as part of the record of team activity.

9. Meet with sponsor and/or stakeholders to obtain approval to implement solutions on a trial basis.

- ◇ Present your list of proposed solutions.

10. Develop an Action Plan for trial implementation of the solutions.

- ◇ Include at least the What, Who, and When of each approved solution to be implemented.
- ◇ Your plan should be specific enough to ensure it won't be misinterpreted by those implementing the solutions.

11. Implement the solutions on a trial basis.

- ◇ If your group is a NWG, you will implement the changes and monitor the impact. If your group is a QAT, you will hand the Action Plan off to the process owner to implement the changes and monitor the impact.

12. Advise sponsor and/or stakeholders of impact of implemented solutions.

- ◇ Present your action plan and performance measures.
- ◇ If your trial implementation is successful, recommend to your sponsor that the solution(s) be implemented permanently.
- ◇ If applicable, recommend to management that the successful solutions be implemented Service-wide.
- ◇ If your trial implementation is less successful than is acceptable, return to step 4 of the PSR and develop a new set of recommended solutions using the data from your trial implementation.

Tools Overview

There are many tools available that can help groups more effectively focus their energies and resources. The most successful problem solvers are able to look at a problem from different perspectives, through a variety of “glasses,” to find the most effective and efficient solutions.

The tools discussed in the Process Improvement Guide fall into four general categories.

- Idea Generation
- Paring/Prioritizing
- Data Collection
- Data Analysis

Generating Ideas and Identifying Opportunities

One of the cornerstones of any performance improvement initiative is getting as many people as possible involved in your improvement efforts. People get excited about contributing to efforts which make things better. Especially when it is their work area or processes being improved! When an environment has been established where people believe something will really be done with their ideas, contributions tend to flow fast and free.

Generating ideas, organizing the information gathered, and then identifying opportunities for improvement is crucial to successful implementation of Quality management practices. The tools and techniques presented in this section will help you in this important task.

What it is:

Brainstorming is a technique, generally used in a group setting, to quickly generate a large number of ideas about a specific problem or topic. It can help you:

- Encourage creative thinking and generate enthusiasm
- Avoid the “paralysis of analysis” by not evaluating ideas

How to do it:

The goal of brainstorming is to generate ideas. Before you start, make sure everyone in your group understands the importance of postponing judgments until after the brainstorming session is completed.

- Post the problem or topic where all participants can see it.
- Write all ideas on the board and do as little editing as possible.
- There are several brainstorming techniques: structured brainstorming, unstructured brainstorming, or silent brainstorming.

In structured brainstorming:

- Solicit one idea from each person in sequence.
- Participants who don't have an idea at the moment may say “pass.”
- The advantage of structured brainstorming is that each person has an equal chance to participate, regardless of rank or personality. The disadvantage of structured brainstorming is that it lacks spontaneity and can sometimes feel rigid and restrictive.

In unstructured brainstorming:

- Participants simply contribute ideas as they come to mind.
- The advantage of unstructured brainstorming is that participants can build off each other's ideas. The atmosphere is very relaxed.
- The disadvantage of unstructured brainstorming is that the less assertive or lower-ranking participants may not contribute.

An ideal approach is to combine these two methods. Begin the session with a few rounds of structured brainstorming and finish with a period of unstructured brainstorming.

In silent brainstorming:

- Have participants write ideas individually on sticky-back notes or small slips of paper.
- Collect the papers and post them for all to see.
- The advantage of silent brainstorming is that it prevents individuals from making disruptive "analysis" comments during the brainstorming session and provides confidentiality. It can help prevent a group from being unduly influenced by a single participant or common flow of ideas.
- The disadvantage of silent brainstorming is that the group loses the synergy that comes from an open session. Silent brainstorming is best used in combination with other brainstorming techniques.

The result of a brainstorming session is a list of ideas. If this list is too long, the group can boil it down using one of the paring/prioritizing tools described later in this section.

Points To Remember About Brainstorming:

Never judge ideas as they are generated. The goal of brainstorming is to generate a lot of ideas in a short time. Analysis of these ideas is a separate process, to be done later.

Don't quit at the first lull. All brainstorming sessions reach lulls, which are uncomfortable for the participants. Research indicates most of the best ideas occur during the last part of a session. Try to encourage the group to push through at least two or three lulls.

Try to write down all of the ideas exactly as they were presented. When you condense an idea to one or two words for ease of recording, you are doing analysis. Analysis should be done later.

Encourage outrageous ideas. While these ideas may not be practical, they may start a flow of creative ideas that can be used. This can help you break through a lull.

Try to have a diverse group. Involve process owners, customers, and suppliers to obtain a diverse set of ideas from several perspectives.

After Brainstorming:

- Reduce your list to the most important items
- Combine items that are similar
- Discuss each item - in turn - on its own merits
- Eliminate items that may not apply to original issue or topic
- Give each person one final chance to add items

Brainstorming is a FUN way to generate a lot of ideas quickly. Because it is simple and easy to use, however, don't lose sight of the fact it can be a very powerful tool!

What it is:

Asking, “Why?” is a favorite technique of the Japanese for discovering the root cause (or causes) of a problem. By repeatedly asking the question, “Why?”, you peel away layer after layer of “symptoms” to get to the real heart of an issue. You may never know exactly how many times you’ll have to ask why. This technique helps you:

- Identify the root cause(s) of a problem
- See how different causes of a problem might be related

How to do it:

- Describe the problem in very specific terms
- Ask why it happens
- If the answer doesn’t identify a root cause, ask why again. You know you’ve identified the root cause when asking why doesn’t yield any more useful information
- Continue asking why until the root causes are identified. This may take more or less than five whys

Points to remember:

- Always focus on the process-aspects of a problem, rather than the personalities involved. Finding scapegoats does not solve problems!
- The answers to each successive “WHY” may require the additional gathering of information.

What are they:

The Three Alignment Questions are used to generate information about how well your processes are currently meeting your customer's needs. To create a meaningful rapport and establish some agreed-upon performance requirements between all those involved in a particular process, ask these three simple questions

- What do you need from me?
- What do you do with what I give you?
- What are the gaps between what I provide and what you need?

How they are used:

These questions will allow you to discover what your customer's needs, wants and expectations may be for the service, product or information you are supplying. Additionally, by understanding how your customer is using your output, you can better align your process capabilities with what your customer wants. Knowing if there are gaps and what the impacts of those gaps are for both you and your customer can provide a rich opportunity to meet your customer's needs.

Once you have generated this information by meeting with your customer(s), you will have some baseline data and a better idea of the direction in which you need to make improvement efforts. You can then organize the responses and prioritize (with the customer) those actions necessary to meet the customer's requirements.

You should also seek to establish a formal, repetitive feedback system to ensure you continue to obtain information on your efforts to meet your customer's needs.

What it is:

Capitalizing on negative thought, the Contingency Diagram is a way to generate ideas concerning an issue or concern. By thinking of all the ways you can cause a problem to get worse or continue unchecked, you provide the basis for later developing an action plan to overcome these barriers.

How to use it:

A Contingency Diagram can help you generate ideas from which you can develop those specific actions necessary to eliminate a problem or make an improvement. You use it by following these steps:

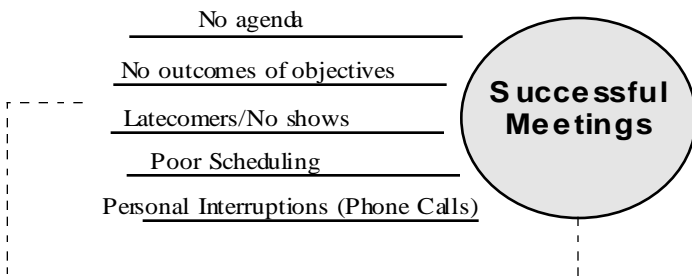
- Step One - Select a situation (either a goal or problem)
- Step Two - Draw a Contingency Diagram (next page)
- Step Three - Brainstorm:
 - What will cause this situation to get worse/continue
 - Think of things that will prevent your desired state
 - Enter each action down on the Contingency Diagram
- Step Four - List specific actions to prevent these obstacles
- Step Five - Use this list to develop an Action Plan

This can be a very powerful idea and solution generating tool. The key is to follow the rules of brainstorming. Once the group has exhausted its ideas on the topic, discuss and clarify the list which has been created.

The Contingency Diagram allows you to tap into the power of brainstorming and provides a convenient framework to organize your ideas. It also allows you to prioritize and generate further action based on those barriers to your desired state which you have creatively discovered.

Contingency Diagram example

Below is an example of a completed Contingency Diagram and the Prevention Checklist/Action Plan it generated.



Each line represents a specific actions which prevents reaching the goal or causing the problem to continue

The oval/cirde represents a specific problem you want to eliminate or a positive goal or desired state you want to achieve.

A Prevention/ Action Checklist can be developed by taking each obstacle identified and brainstorming ways to prevent it from happening. Below is an example using only one of the items identified above.

Prevention/Action Checklist	
Obstacles	Corrective Actions
1. Poor Scheduling	1. Publish agenda in advance 2. Check everyone's schedule in advance. 3. Hold members accountable for schedules.

Another good technique is to take each of the items you have identified as a barrier and put it into the oval and complete a separate Contingency Diagram. This allows for some specific action items and generates a tremendous number of ideas.

What it is:

An affinity diagram is a technique for organizing verbal information into a visual pattern. An affinity diagram starts with specific ideas and helps you work toward broad categories. This is the opposite of a Cause and Effect Diagram, which starts with the broad effects and works toward specific causes. You can use either technique to explore all aspects of an issue.

Affinity diagrams can help you:

- Organize and give structure to a list of factors that contribute to a problem.
- Identify key areas where improvement is most needed.

How to use it:

Identify the problem. Post the problem or issue in a location where all team members can see it.

Generate ideas. Use index cards or sticky-back notes to record the ideas.

Cluster your ideas (on cards or paper) into related groups. Use questions like “Which other ideas are similar?” and “Is this idea somehow connected to any others?” to help you group the ideas together.

Create affinity cards. For each group, create a card that has a short statement describing the entire group of ideas.

Cluster related affinity cards. Put all of the individual ideas in a group under their affinity card. Now try to group the affinity cards under even broader groups. You can continue to group the cards until your definition of “group” becomes too broad to have any meaning.

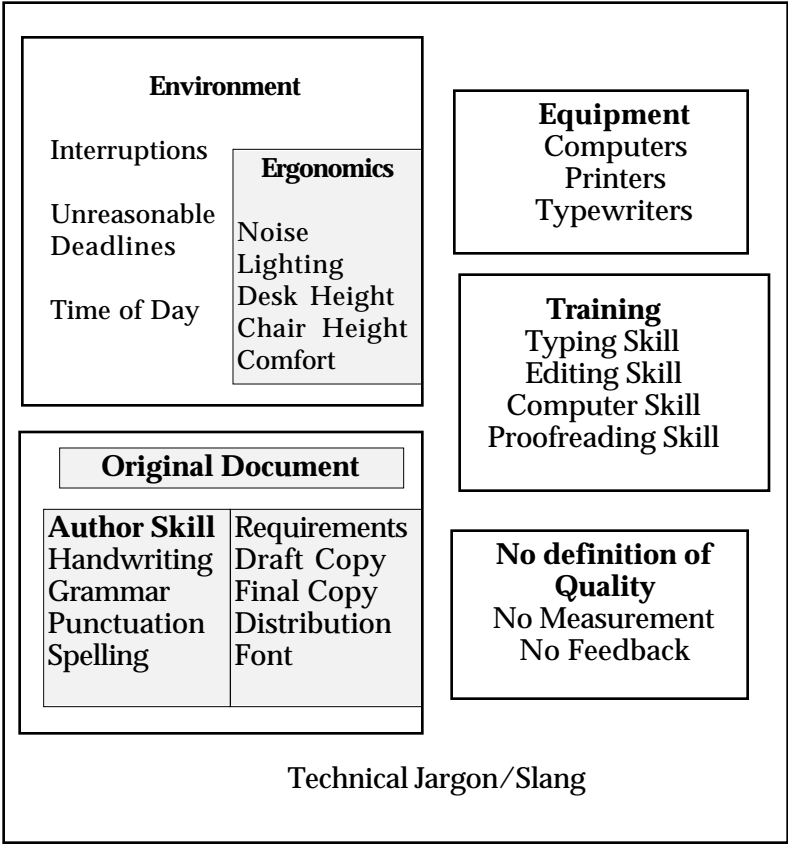
Create an affinity diagram. Post all of the ideas and affinity cards. Draw outlines of the groups with the affinity cards at the top of each group. The resulting hierarchical structure will give you valuable insight into the problem.

Affinity Diagram Example

A publication team wanted to reduce the number of typographical errors in their program’s documentation. As part of a first step, they conducted a brainstorming session that produced the following list of factors that influenced errors.

Computers	No feedback	Proofreading Skill
Printers	Unreasonable	Noise
	Deadlines	
Lighting	Typewriters	Chair Height
Comfort	Desk Height	Time of Day
Technical Jargon	Interruptions	Handwriting
Grammar	Slang	Spelling
Draft Copy	Punctuation	Distribution
Font	Final Copy	Editing Skill
Computer Skill	Typing Skill	No Measurement

The following affinity diagram helped them to focus on areas for further analysis.



Tips for keeping ideas flowing

Use 3x5 cards or Post-It notes to record your ideas: This allows you to cluster similar thoughts, eliminate duplications and use a “silent” version of any of the techniques listed in this section. This can be helpful when issues carry a lot of emotion.

Be creative! Don't limit suggestions or ideas early on in discussions. Encourage people to think “outside the box.” Play “What If” and try to visualize the desired state IF you could do anything you wanted. Play “If I were the Commandant...”

During your idea generating sessions:

- Change seats....views can be affected by where you sit in relation to others
- Avoid cliques...encourage people to sit with those whom they don't know
- Review the data or ideas periodically - encourage further inputs
- Rotate groups (and/or members) to provide a fresh perspective

Make it clear you want EVERYONE to participate!

- Create a climate where it is O.K. to disagree
- Work to develop a group consensus
- Don't evaluate...concentrate on getting a quantity of ideas

HAVE FUN!

What it is:

Multi-voting is a quick and easy way for a group to determine which items in a list are most important. This technique helps you:

- Pare down a larger list into a manageable few.
- Separate the “vital few” items from the “important many.”

How to do it:

Empower. Give each team member a number of votes equal to approximately half the number of items on the list (e.g., 10 votes for a 20-item list). Discourage Block-Voting where all 10 votes are placed on one item. Break up the votes.

Vote. Have the members vote individually for the items they believe have high priority.

Compile the votes given to each item. You can put a mark beside each item for every vote it receives.

Reduce the list. Remove the items with the fewest votes.

Repeat as necessary.

Helpful hint:

Multi-voting is best suited for large groups and long lists. Its simplicity makes it very quick and easy to use.

Multi-Voting Example

District staff elements attended a lot of meetings at different locations around their district. They complained because meetings conducted at these locations were not always as productive as they might have been, so the Chief of Staff called a meeting to improve the situation. A brainstorming session produced the following list of reasons for unproductive meetings:

List of Reasons for Unproductive Meetings

- | |
|---|
| <ol style="list-style-type: none">1. No agendas2. No clear objectives3. Going on tangents4. Too much time5. Too much protocol/politics6. Wrong people7. Not enough data provided before meeting8. No administrative support9. Roles of participants not clear |
|---|

To reduce this list to a manageable size, each member was given five (05) votes (approximately half of the total number of items).

The problems received the following votes:
--

- | | |
|----------------|----------------|
| 1. //// | 6. ///// |
| 2. // | 7. ///// ///// |
| 3. /// | 8. // |
| 4. ///// ///// | 9. ///// /// |
| 5. /// | |

The group then decided to focus on problems 4, 7, and 9.

Nominal Group Technique

Paring/Prioritizing

What it is:

Nominal group technique is a structured method that a group can use to prioritize items in a list. This method uses priorities of each group member to discover the overall priorities of the group. Nominal group technique helps you:

- Prioritize a list of ideas.
- Make decisions using inputs from all participants.

How to do it:

Assign a letter to each idea. For example, for eight ideas, you would assign the letters A through H.

List the letters. Have each person in the group write the assigned letters on a piece of paper.

Prioritize the lists. Have each person prioritize their list by writing a number beside each letter. If there are eight ideas, then “8” is written beside the letter corresponding to the most important idea. This is repeated for each number until “1” is written beside the letter corresponding to the least important idea. Each number (1 through 8) is used only once by each group member.

Compute the group total for each letter. The letter with the highest score is the idea with the highest priority, and the letter with the lowest score has the lowest priority.

Nominal Group Technique Example

The following office problems were identified in a brainstorming session:

- A. Ineffective organizational structure
- B. Poor communications outside the office
- C. Lack of training
- D. Poor communications within the office
- E. Unclear mission and objectives
- F. Poor distribution of office mail
- G. Lack of feedback on reports on management

Each group member then wrote the letters A through G on a piece of paper and prioritized each problem from 1 to 7 (lowest to highest), using each number only once. The results were summarized as follows:

Problem	Person					Total	Priority
	1	2	3	4	5		
A	6	5	7	5	6	29	#2
B	3	2	4	1	3	13	#5
C	1	1	2	2	2	8	#7 Lowest Priority
D	4	4	5	6	4	23	#4
E	7	7	6	7	5	32	#1 Highest Priority
F	2	3	1	3	1	10	#6
G	5	6	3	4	7	25	#3

What it is:

Pairwise ranking is a structured method for ranking a small list of items in priority order. It can help you:

- Prioritize a small list.
- Make decisions in a consensus-oriented manner.
- Promotes discussions of items in a head-to-head manner.

How to do it:

Construct a pairwise matrix. Each box in the matrix represents the intersection (or pairing) of two items. If your list has five items, the pairwise matrix would look like this, with the top box representing idea 1 paired with idea 2:

	1			
2		2		
3			3	
4				4
5				

Rank each pair. For each pair, have the group (using a consensus-oriented discussion) determine which of the two ideas is preferred. Then, for each pair, write the number of the preferable idea in the appropriate box. Repeat this process until the matrix is filled.

	1			
2	1	2		
3	1	3	3	
4	1	2	3	4
5	1	5	5	5

“3” and “1” compared; “1” is better. “5” and “3” compared; “5” is better... and so on...

Count the number of times each alternative appears in the matrix.

	1				
2	1	2			
3	1	3	3		
4	1	2	3	4	
5	1	5	5	5	

Alternative "1" appears 4 times in the matrix

Alternative	1	2	3	4	5
Count	4	1	2	0	3
Rank					

Rank all items. Rank the alternatives by the total number of times they appear in the matrix. To break a tie (where two ideas appear the same number of times), look at the box in which those two ideas are compared. The idea appearing in that box receives the higher ranking.

Alternative	1	2	3	4	5
Count	4	1	2	0	3
Rank	1st	4th	3rd	5th	2nd

Alternative "1" ranks 1st overall

What it is:

Force field analysis is a technique that helps you identify and visualize the relationships between the significant forces that influence a problem or goal. You can use it to:

- Identify key factors (forces) that promote or hinder the solution of a problem or the achievement of a goal.
- Identify improvement opportunities.

How to do it:

Define the objective. Clearly identify the problem or goal to be analyzed.

List the forces. List the key factors that promote or hinder the achievement of your goal or the resolution of your problem. Groups should use an idea- generation technique . Use two lists: one for promoting forces and one for hindering forces.

Prioritize. Prioritize the forces in each list according to their relative impact on the problem or goal. You can use nominal group technique or some other decision-making tool.

Implement. Minimize or weaken the hindering forces and maximize or strengthen the promoting ones.

Goal: Quit Smoking	
Promoting Forces	Inhibiting Forces
<p> better health → save money → family won't breathe smoke → food will taste better → won't have to leave building every half hour→ </p>	<p> ← habitual behavior ← need for nicotine ← need to have fingers occupied ← need to have something in mouth ← gain weight every time I try to quit </p>

What is it:

The decision matrix, also called selection grid or prioritization matrix, is used for selecting one option from several possibilities. It involves selecting criteria by which the items will be judged and using them to make an acceptable decision. It can be used to choose a single problem or solution from a list.

How to do it:

Generate a list. Generate a list of options using an idea generation tool, then pare the list down to a manageable few.

Choose criteria. Once the list of criteria is generated, the team needs to discuss and refine the list to the five or six that the team believes are the most important. Criteria that are often used include:

- Effectiveness
- Feasibility
- Capability
- Time requirements
- Cost
- Enthusiasm (of the team and of others)

Weigh the Criteria. After the criteria are identified, the team then assigns a relative weight to each criterion, based on how important that criterion is to the situation. There are different ways the solutions can be graded against the criteria. One way is to answer with a Yes/No. Problems might arise if two different solutions receive the same number of Yes/No votes. Another way is to grade or rate the criteria on a scale in relation to each of the options. The option with the highest (or lowest depending on the scale used) point total might be the option the group decides to focus on first.

Draw a grid. Create the grid with the criteria across the top and the options along the left side.

Decision Matrix Example

	Criteria #1 (weight value)	Criteria #2 (weight value)	Criteria #3 (weight value)	Score
Solution #1				
Solution #2				
Solution #3				

Evaluate Choices. Evaluate each choice against the criteria.

Calculate Weight Values. Multiply each choice's rating by the weight. As Nancy Tague indicated in her book *The Quality Toolbox*, "The choice with the highest score will not necessarily be the one to choose, but the relative scores can generate meaningful discussion and lead the team toward consensus."

Data and Data Collection

Overview:

Improving your decision making process through the appropriate use of data and learning to collect the right data are crucial performance improvement skills. By using the tools and techniques in this section, you will be able to gather data that will be meaningful to you and useful in your improvement efforts.

What is Data?

Basically, it is the numerical facts and figures which contain the information you will need to form conclusions or make your decisions. Data will generally be presented in descriptive or quantitative form.

Types of Data

MEASUREMENT DATA (Measurements)	Data resulting from physical measurements Example: Distance, time, weight, etc. (also known as Measurement or Continuous Data)
ATTRIBUTE DATA (Traits)	Data resulting from a count of units possessing particular characteristics or from a count of the occurrences of those characteristics themselves (also called Discrete Data) Example: Number of typos per page, good/bad.

Why Collect Data?

- To provide a foundation to “sell” proposed solutions or other actions to those in decision-making positions.
- To provide the basis for process control and improvement.
- To enable you to focus on the real reasons for problems, not just assumptions, symptoms, or “gut” feelings.
- To communicate the situation/issues more accurately and effectively.

- To allow you to methodically examine the relationship between the occurrence of an event and its cause(s).
- To serve as the basis for timely action (or appropriate non-action).

Five Elements of Useful Data

To be most useful, your data should be:

- Accurate,
- Related to your process,
- Collected in a timely manner,
- Collected in a consistent manner, and
- Precisely defined (definitions should be agreed-upon by all process participants, i.e.. Supplier/Customer/Process Worker).

Effective Data Collection Strategy

Answering the following questions will allow you to develop an effective strategy for collecting data.

- What do we want to accomplish by collecting the data?
- What data is needed to achieve this goal?
- Where in the process should we collect data?
- What sampling scheme should we use?
- How much data (how many samples/data points) is needed?
- When/how long should data be collected?
- How will we record the data?
- Who is responsible for collecting the data?
- Is the collection method simple and efficient?

Once you have developed answers to these questions, review your data collection plan for consistency, completeness, and the potential for gaining commitment to your data collection effort from others involved in the process being observed.

What it is:

A check sheet is a form you can use to collect data in an organized manner and convert it into readily useful information (Paretos or Histograms). With a check sheet, you can:

- Collect data with minimal effort.
- Convert raw data into useful information.
- Translate opinions of what is happening into what is actually happening. In other words, “I think the problem is . . .” becomes “The data says the problem is . . .”

How to use it:

Clearly identify what is being observed. The events being observed should be clearly labeled. Everyone has to be looking for the same thing.

Keep the data collection process as easy as possible. Collecting data should not become a job in and of itself. Simple check marks are easiest.

Group the data. Collected data should be grouped in a way that makes the data valuable and reliable. Similar problems must be in similar groups.

Be creative. Try to create a format that will give you the most information with the least amount of effort.

Tabular Check Sheet Example Reasons for Rejected Travel Claims

Reason	May 6	May 7	May 8	Total
Original Orders not attached			++++	12
Claim not signed by a supervisor				7
All receipts for claims over \$75 not attached				7

What are they:

Surveys, interviews and focus groups are used to gather information from an identified target population. They are a feedback mechanism and, when properly designed and carried out, provide a great deal of usable information. They are especially useful when:

- Only a small amount of initial data is available.
- Participation of an extended group is desirable.
- Initial issues are unclear and in need of amplification/clarification.

How they are used:

Sampling theory and techniques is a science. It takes experience to design and process a high quality survey or structure interviews and focus groups. The following guidelines should help.

- Clearly identify what information you need to collect.
- Make it as simple and as easy as possible for people to participate.
- Clearly identify to participants what you intend to do with their answers.
- Identify how to complete, where, and when to return the survey.
- Do a test run on a small pilot population to remove any “bugs.”
- Design the survey so it will be easy for you to process its information.
- As much as possible, conduct the survey/interview face-to-face.
- Make it important to participants to return the survey/interview form.
- Agree to publish your results in an appropriate time/manner.
- ACT on the results!

Basic Tools for Analyzing

Overview

The tools in this section will allow you to examine your data from several different viewpoints. They help organize data so your process can “talk” to you and tell you what is happening (or not happening). These tools also allow you to package data so it is easily understood by others. This can be important when you sell your proposed solutions to those in decision-making positions.

What Can These Tools Do For Me?

- They are educational.
- They serve as a great guide for discussions.
- They allow you to search out “root causes.”
- They allow for converting raw numbers to usable information.
- They show the level of understanding (or lack of understanding) of your process.
- They apply to many processes and problems.
- They are generally easy to use and understand.

What it is:

A flowchart is a graphic representation of the major steps of a process. It can help you:

- Understand the complete process.
- Identify the critical stages of a process.
- Locate problem areas.
- Show relationships between different steps in a process.

How to use it:

Identify the process. Define the start point and finish point for the process to be examined.

Describe the current process. Chart the whole process (i.e., lay out all the steps) from beginning to end. You can use the symbols shown on the next page to improve the clarity of your flowchart.

(Optional) Chart the ideal process. Try to identify the easiest and most efficient way to go from the “start block” to the “finish block.” While this step isn’t absolutely necessary, it does make it easier to do the next step.


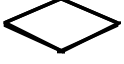
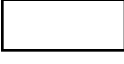


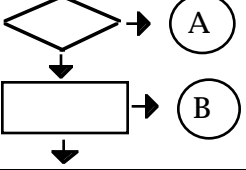

Search for improvement opportunities. Identify all the areas that hinder your process or add little or no value. If you did the optional step, examine all areas that differ from your ideal process and question why they exist.

Update your chart. Build a new flowchart that corrects the problems you identified in the previous step.

Helpful hint:

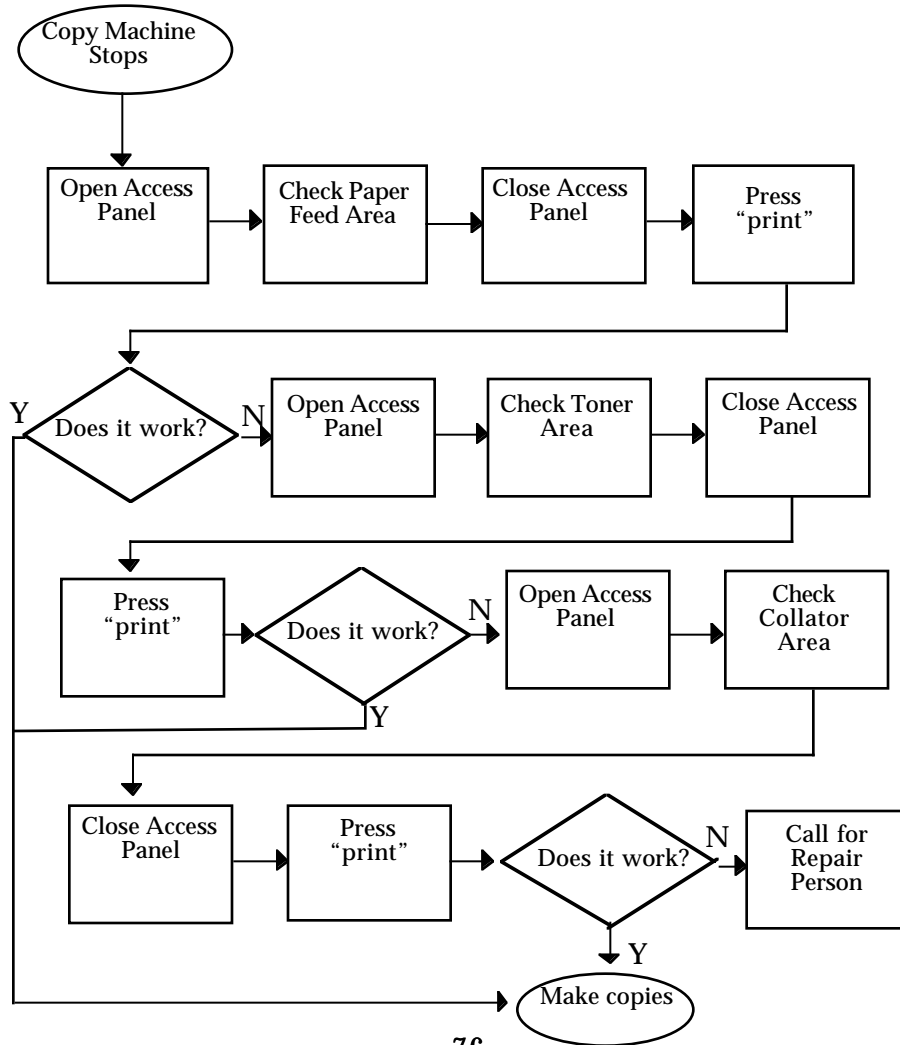
You can put the steps of your process on index cards or sticky-back notes. This lets you rearrange the diagram without erasing and redrawing and prevents ideas from being discarded simply because it's too much work to redraw the diagram.

These are standard flowchart symbols.

This symbol...	Represents.....	Some examples are.....
	Start/Stop	Receive trouble report Receive Input from supplier
	Decision Point	Approve/Disapprove Accept/Reject Yes/No
	Activity	Drop off Travel Voucher Open Access panel
	Document	Fill out a trouble report
	Connector (to another page or part of diagram.)	
	Database	MSIS and AMVER

Flowchart Example

Before it was eventually replaced, a copy machine suffered frequent paper jams and became a notorious troublemaker. Often, a problem could be cleared by simply opening and closing the access panel. Someone observed the situation and flowcharted the troubleshooting procedure used by most people.



What it is:

A Cause and Effect Diagram graphically illustrates the relationship between a given outcome and all the factors that influence this outcome. Sometimes called an Ishikawa or “fishbone” diagram, it helps show the relationship of the parts (and sub-parts) to the whole by:

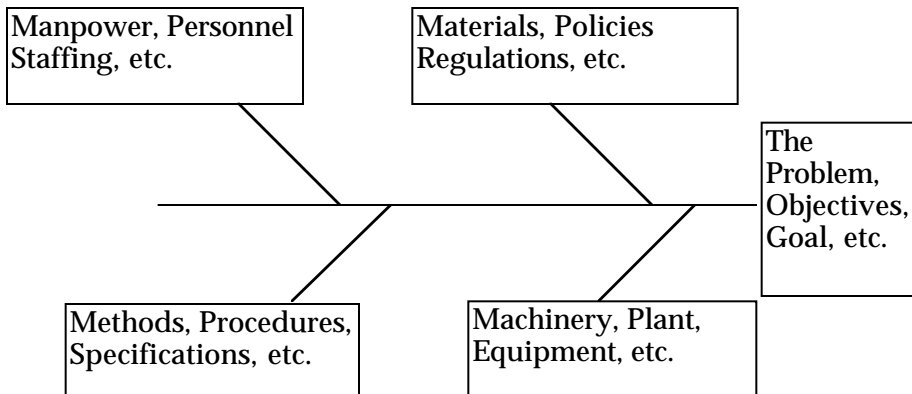
- Determining the factors that cause a positive or negative outcome (or effect).
- Focusing on a specific issue without resorting to complaints and irrelevant discussion.
- Determining the root causes of a given effect.
- Identifying areas where there is a lack of data.

How to use it:

Specify the effect to be analyzed. The effect can be positive (objectives) or negative (problems). Place it in a box on the right side of the diagram.



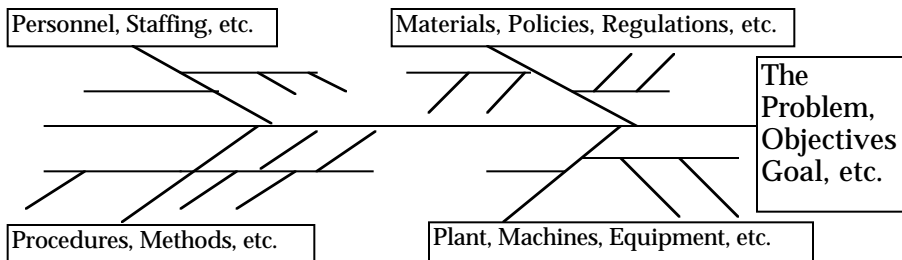
List the major categories of the factors that influence the effect being studied. The “4 Ms” (methods, manpower, materials, machinery) or the “4 Ps” (policies, procedures, people, plant) are commonly used as a starting point.



Identify factors and subfactors. Use an idea-generating technique to identify the factors and subfactors within each major category. An easy way to begin is to use the major categories as a catalyst. For example, “What policies are causing ...?”

How do our people influence...?
affect...?

What regulations



What procedures are causing...?

How does our equipment
affect...?

Identify significant factors. Look for factors that appear repeatedly and list them. Also, list those factors that have a significant affect, based on the data available.

Categorize and prioritize your list of causes. Keep in mind that the location of a cause in your diagram is not an indicator of its importance. A sub-factor may be the root cause to all of your problems. You may also decide to collect more data on a factor that had not been previously identified.

Helpful hint:

Consider using a positive effect (an objective, for example) instead of a negative effect (a problem, for example) as the effect to be discussed. Focusing on problems can produce “finger pointing,” while focusing on desired outcomes fosters pride and ownership over productive areas. The resulting positive atmosphere will enhance the group’s creativity.

What it is:

Pareto Charts graphically represent data for easier interpretation than is found in raw numbers. They are bar charts used to separate the “vital few” from the “trivial many.” These charts are based on the Pareto Principle which states that 20 percent of the problems have 80 percent of the impact. The 20 percent of the problems are the “vital few” and the remaining problems are the “trivial many.” A Pareto chart can help you:

- Separate the few *major* problems from the many possible problems so you can focus your improvement efforts
- Arrange data according to priority or importance
- Determine which problems are most important, using data, not perceptions

How to use it:

Use existing measurement plans, or collect new data on the process. Be sure the units of measure are consistent throughout your data. Select attributes to be charted so that any given occurrence will fall into one **AND ONLY ONE** category. Checksheets are great sources of data for building a Pareto.

Label the chart. Label the units of measure on the left vertical axis and the categories of problems on the horizontal axis.

Plot the data. Order the categories according to their frequency, not their classification. Use a descending order from left to right. Categories that appear infrequently, or in comparatively small numbers, can be grouped together in an “other” category.

(Optional). You can use the right vertical axis to measure the percentage of total occurrences contained within each category.

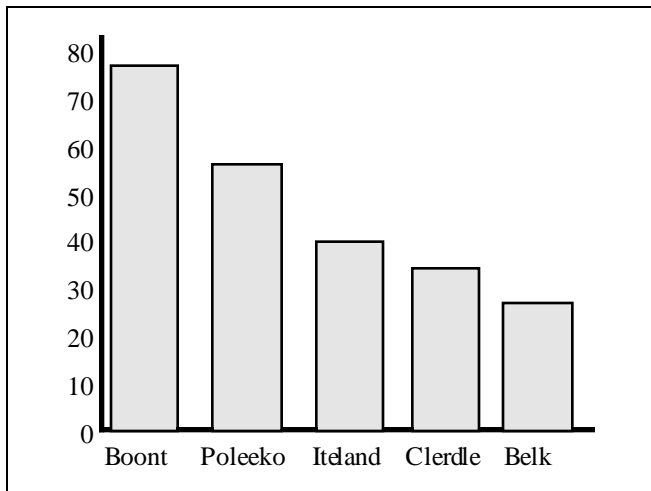
Points to remember:

- The measurement units can significantly affect your Pareto chart. You must determine whether cost or number of occurrences is more important.
- It is essential to use the same units of measure and clearly mark these units on the chart (\$, #, %, etc.).
- Make sure that the “other” category doesn’t become unreasonably large. If the “other” category accounts for more than 25 percent of your problem, you probably should try to break it down.
- Pareto Charts are read from left to right, in descending order to highlight the significant areas of interest.

Pareto Chart Example: Headquarters has received feedback concerning the need for additional resources in several geographic areas. A team has collected data on five locations and their workload. The checksheet below shows a week’s worth of boardings.

Station	BWI	Unsafe Operations	No survival equipment	Unseaworthy vessels	Totals
Poleeko Pt.	2	16	19	20	57
Boont Bay	3	19	33	23	78
Iteland Is.	1	7	9	23	40
Belk Bay	1	8	17	4	30
Clerdle Cv.		9	16	13	38
Totals	7	59	94	83	243

The Pareto Chart can be based either on the number of occurrences by station, by the type of case or cost of responding. This Pareto example is based on number of occurrences by station.



Progressive Analysis. Progressive analysis takes one category from the Pareto and breaks it down into its subparts progressing from the general classifications to the specific. It is used when the category has many subparts to it that might be affecting it. The resulting bar graph is a Pareto Chart which can then be broken down even further.

What it is:

A histogram is a bar graph that shows the central tendency and variability of a data set. Histograms are sometimes referred to as frequency distributions. A histogram can help you:

- Understand the variability of a process.
- Quickly and easily determine the underlying distribution of a process.

How to use it:

Determine the type of data you want to collect. Be sure that the data is measurable, (for example, time, length, speed, etc.).

Collect the data. Collect as many measurable data points as possible. Collect data on one parameter at a time. Checksheets may be used, but are not the only way to collect data for a histogram.

Count the total number of points you have collected.

Determine the number of intervals required. Use this table to determine how many intervals (or bars) the graph should have.

<i>If you have this many data points...</i>	<i>Then use this number of intervals</i>
less than 50	5 - 7
50 - 99	6-10
100 - 249	7 - 12
More than 250	10 - 20

Determine the range. Subtract the smallest value in the data set from the largest. This value is the range of your data set.

Determine the interval width. Divide the range by the number of intervals. Round your answers up to a convenient value. For example, if the range of the data is 17 and you have decided to use 9 intervals, then your interval width is 1.88. You can round this to 1.9 or 2.0. It is helpful to have intervals defined to one more decimal place than the data collected.

Determine the starting point of each interval. Use the smallest data point value as the starting point of the first interval. The starting point for the second interval is the sum of the smallest data point plus the interval width. For example, if your smallest data point is 10 and the interval width is 2, then the starting point for the second interval is 12. Label intervals along the horizontal axis.

Plot the data. Count the number of data points that fall within each interval and plot this frequency on the histogram. Keep in mind that each data point can appear in only one interval. For example, if your first interval begins with 10.0 and the second with 12.0, then all data points that are equal to or greater than 10.0 and still less than 12.0 are counted in the first interval.

Points to remember:

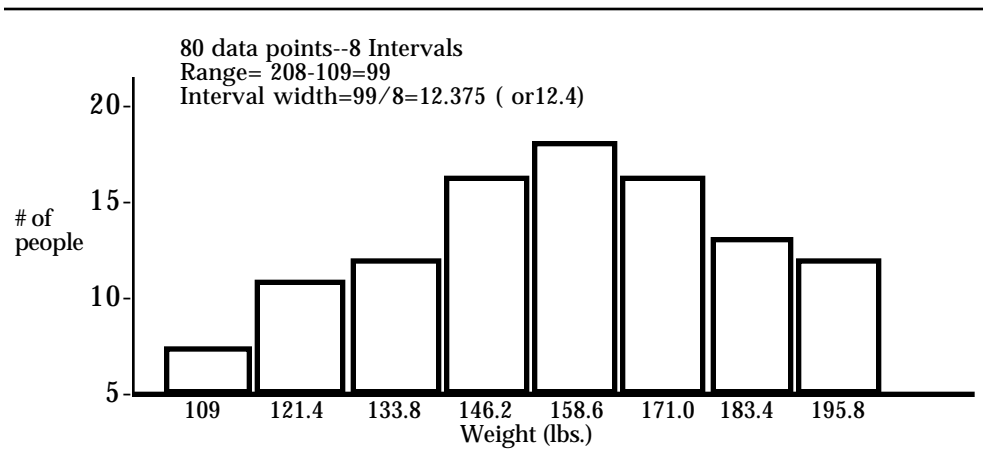
- Each data point appears in one and only one interval.
- The number of intervals can influence the pattern your data will take.
- Don't expect the histogram to be a perfect bell curve; variations will occur. Ask yourself if the picture is reasonable and logical. But, be careful not to let your preconceived ideas influence your decision unfairly.

Histogram Example

The weights of 80 Coast Guard personnel are laid out in this table:

208	180	159	163	159
155	180	165	149	127
159	171	141	190	159
153	181	180	137	161
115	156	173	165	191
159	109	179	145	144
150	206	166	188	165
127	130	172	180	147
145	150	156	171	189
190	200	208	169	139
130	128	155	185	166
165	187	159	178	169
147	150	201	128	170
189	163	150	158	180
139	149	185	129	169
175	189	150	201	175

The distribution of the points into a histogram are as follows:



What it is:

A run chart is a graph that shows the changes in a process measurement over time. It can help you:

- Recognize patterns of performance in a process.
- Document changes over time.

How to use it:

Construct the chart. Label the vertical axis with the key measurement of the process being measured.

Collect the data. Collect data for an appropriate number of time periods, in accordance with your data collection strategy.

Plot the data. Plot each data point on the chart. Calculate and plot the average. This provides a reference for drawing conclusions about individual data points.

Interpret the chart. Interpret the chart using your knowledge of the process. Some possible signals that the process has significantly changed are:

- Six points in a row that steadily increase or decrease.
- Nine points in a row that are on the same side of the average.
- Other patterns to look for include significant shifts in levels, cyclical patterns and bunching of data points.

Repeat. Compute the average for subsequent blocks of time, or after a significant change has occurred.

Run Chart Example

This run chart shows how many minutes it took the crewmembers to get the boat underway after the SAR alarm had sounded.

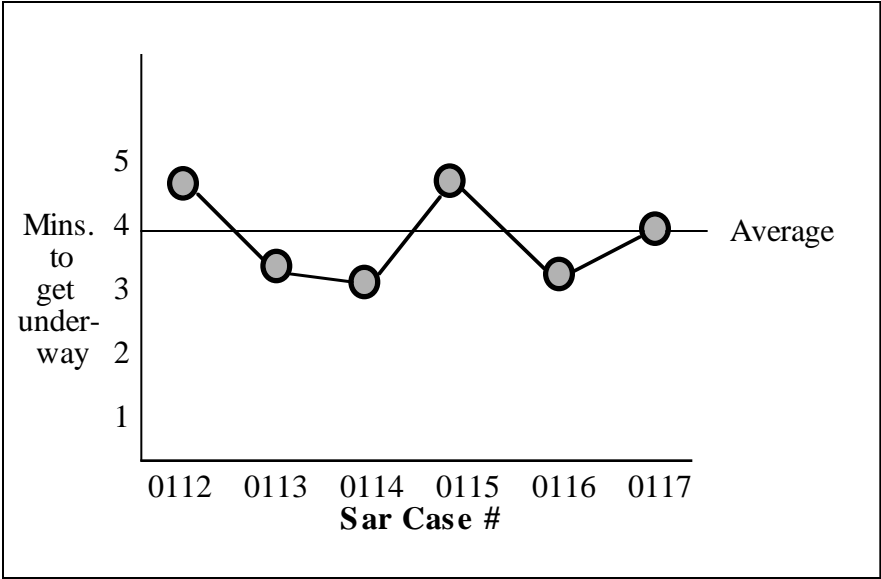


Table of Tool Usage

Frequent	•
Occasional	o

Quality Tools	Generate a List	Select from a List	Verify & Define	Formulate Theories	Collect Data	Test Theories
Affinity Diagram	o					
Alignment Questions	o		•			
Brain-storming	•			•		
Cause & Effect	•		•	o		•
Contin-gency	o		o	o		
Data Collection	o		o		•	o
Decision Matrix		•				
Flowchart	•		•	o	o	•
Force Field Analysis	•	o	o			
Histogram				o	o	
Multi-vote		•				
Nominal Group Tech.		•				
Pairwise Ranking		•				
Pareto				o	o	
Run Chart					o	
Why Technique	o		o	o	o	

Table of Tool Usage

Frequent	•
Occasional	o

Quality Tools	ID Root Causes	Develop Plan	Gain Commitment	Execute Plan	Monitor Impacts
Affinity Diagram					
Alignment Questions					o
Brainstorming	o	•			
Cause & Effect	•	•			
Contingency	o				
Data Collection	o			o	o
Decision Matrix					
Flowchart	o	•	•	•	
Force Field Analysis	o	o	o		
Histogram	o		o		•
Multi-vote					
Nominal Group Tech.					
Pairwise Ranking					
Pareto	o		o		•
Run Chart	o		o		•
Why Technique	•				

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